CLAIMS

What is claimed is:

1   1.   A method comprising:
2   reading at least one sequence of images;
3   preparing autocrop data for each image of each of the sequences of images; and
4   storing autocrop data for each key frame of the sequences of images.

2.   The method of Claim 1 wherein preparing autocrop data comprises:
determining the active region of a current image of the sequences of images.

1   3.   The method of Claim 2 wherein determining the active region comprises:
2   selecting a portion of the current image as the active region of the current image
3   such that all pixels outside the active region have no opacity.

1   4.   The method of Claim 3 wherein selecting a portion comprises:
2   reading the current image;
3   locating a first vertical line of pixels with at least one pixel having non-zero opacity
4   closest to the origin of the image;
5   locating a second vertical line of pixels with at least one pixel having non-zero
6   opacity furthest from the origin of the image;
7   locating a first horizontal line of pixels with at least one pixel having non-zero
8   opacity closest to the origin of the image;
9   locating a second horizontal line of pixels with at least one pixel having non-zero
10   opacity furthest from the origin of the image; and
11   storing data specifying the active region of the current image.

1   5.   The method of Claim 4 wherein
2   locating the first vertical line and locating the second vertical line are performed
3   before locating the first horizontal line and locating the second horizontal line; and
4   locating the first horizontal line and locating the second horizontal line each
5   comprise examining pixels between the first vertical line and the second vertical line.

1   6.   The method of Claim 4 wherein
2   locating the first horizontal line and locating the second horizontal line are
3   performed before locating the first vertical line and locating the second vertical line; and
4   locating the first vertical line and locating the second vertical line each comprise
5   examining pixels between the first horizontal line and the second horizontal line.

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1   7.   The method of Claim 4 wherein storing data specifying the active region of

2 the current image comprises:

3   storing the x coordinate of the first vertical line, the x coordinate of the second

4 vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second

5 horizontal line.

8.   The method of Claim 1 further comprising:

determining which images of each of the sequences of images are key frames.

1   9.   The method of Claim 8 wherein determining comprises:

2   determining whether the current image is the first frame of one of the sequences of

3 images, and, if so, designating the current image as a key frame;

4   determining whether the active region of the current image is outside the active

5 region of a prior image, and, if so, designating the current image as a key frame; and

6   determining whether smoothing is needed, and, if so, designating the current image

7 as a key frame.

1   10.   The method of Claim 9 wherein determining whether smoothing is needed

2 comprises:

3   calculating the difference in area between the active region of the current image and

4 the active region of the prior image; and

5   comparing the difference in area with a smoothing factor.

1   11.   The method of Claim 10 wherein the smoothing factor is a numerical value

2 set by a user.

1   12.   The method of Claim 9 wherein the active region is a portion of any image

2 such that all pixels outside the active region of the image have no opacity.

1   13.   The method of Claim 2 further comprising:

2   adding a boundary to the active region of the current image.

1   14.   The method of Claim 13 wherein the boundary is a numerical value set by a

2 user.

1   15.   A machine readable medium having stored thereon instructions which when
2   executed by a processor cause the machine to perform operations comprising:
3   reading at least one sequence of images;
4   preparing autocrop data for each image of each of the sequences of images; and
5   storing autocrop data for each key frame of the sequences of images.

1   16.   The machine readable medium of Claim 15 wherein preparing autocrop data
2   causes the machine to perform operations comprising:
3   determining the active region of a current image of the sequences of images.

1   17.   The machine readable medium of Claim 16 wherein determining the active
2   region data causes the machine to perform operations comprising:
3   selecting a portion of the current image as the active region of the current image
4   such that all pixels outside the active region have no opacity.

1   18.   The machine readable medium of Claim 17 wherein selecting a portion
2   causes the machine to perform operations comprising:
3   reading the current image;
4   locating a first vertical line of pixels with at least one pixel having non-zero opacity
5   closest to the origin of the image;
6   locating a second vertical line of pixels with at least one pixel having non-zero
7   opacity furthest from the origin of the image;
8   locating a first horizontal line of pixels with at least one pixel having non-zero
9   opacity closest to the origin of the image;
10   locating a second horizontal line of pixels with at least one pixel having non-zero
11   opacity furthest from the origin of the image; and
12   storing data specifying the active region of the current image.

1   19.   The machine readable medium of Claim 18 wherein:
2   locating the first vertical line and locating the second vertical line are performed
3   before locating the first horizontal line and locating the second horizontal line; and
4   locating the first horizontal line and locating the second horizontal line each
5   comprise examining pixels between the first vertical line and the second vertical line.

20.　　The machine readable medium of Claim 18 wherein:

locating the first horizontal line and locating the second horizontal line are performed before locating the first vertical line and locating the second vertical line; and

locating the first vertical line and locating the second vertical line each comprise examining pixels between the first horizontal line and the second horizontal line.

21.　　The machine readable medium of Claim 18 wherein storing data specifying the active region of the current image causes the machine to perform operations comprising:

storing the x coordinate of the first vertical line, the x coordinate of the second vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second horizontal line.

22.　　The machine readable medium of Claim 15 having stored thereon further instructions which when executed by the processor cause the machine to perform further operations comprising:

determining which images of each of the sequences of images are key frames.

23.　　The machine readable medium of Claim 22 wherein determining causes the machine to perform operations comprising:

determining whether the current image is the first frame of one of the sequences of images, and, if so, designating the current image as a key frame;

determining whether the active region of the current image is outside the active region of a prior image, and, if so, designating the current image as a key frame; and

determining whether smoothing is needed, and, if so, designating the current image as a key frame.

24.　　The machine readable medium of Claim 23 wherein determining whether smoothing is needed causes the machine to perform operations comprising:

calculating the difference in area between the active region of the current image and the active region of the prior image; and

comparing the difference in area with a smoothing factor.

25.　　The machine readable medium of Claim 24 wherein the smoothing factor is a numerical value set by a user.

26.　　The machine readable medium of Claim 23 wherein the active region is a portion of any image such that all pixels outside the active region of the image have no opacity.

27. The machine readable medium of Claim 16 having stored thereon further instructions which when executed by the processor cause the machine to perform further operations comprising:

 adding a boundary to the active region of the current image.

28. The machine readable medium of Claim 13 wherein the boundary is a numerical value set by a user.

29. A system comprising:

 a processor coupled to a bus;

 a memory coupled to the bus;

 a storage device coupled to the bus, the storage device having stored thereon instructions which when executed by the processor cause the system to perform operations comprising:

 reading at least one sequence of images;

 preparing autocrop data for each image of each of the sequences of images; and

 storing autocrop data for each key frame of the sequences of images on the storage device.

30. The system of Claim 29 wherein preparing autocrop data causes the system to perform operations comprising:

 determining the active region of a current image of the sequences of images.

31. The system of Claim 30 wherein determining the active region data causes the system to perform operations comprising:

 selecting a portion of the current image as the active region of the current image such that all pixels outside the active region have no opacity.

32. The system of Claim 31 wherein selecting a portion causes the system to perform operations comprising:

 reading the current image;

 locating a first vertical line of pixels with at least one pixel having non-zero opacity closest to the origin of the image;

 locating a second vertical line of pixels with at least one pixel having non-zero opacity furthest from the origin of the image;

 locating a first horizontal line of pixels with at least one pixel having non-zero opacity closest to the origin of the image;

10   locating a second horizontal line of pixels with at least one pixel having non-zero
11   opacity furthest from the origin of the image; and
12   storing data specifying the active region of the current image.

1   33.   The system of Claim 32 wherein:
2   locating the first vertical line and locating the second vertical line are performed
3   before locating the first horizontal line and locating the second horizontal line; and
4   locating the first horizontal line and locating the second horizontal line each
5   comprise examining pixels between the first vertical line and the second vertical line.

1   34.   The system of Claim 32 wherein:
2   locating the first horizontal line and locating the second horizontal line are
3   performed before locating the first vertical line and locating the second vertical line; and
4   locating the first vertical line and locating the second vertical line each comprise
5   examining pixels between the first horizontal line and the second horizontal line.

1   35.   The system of Claim 32 wherein storing data specifying the active region of
2   the current image causes the system to perform operations comprising:
3   storing the x coordinate of the first vertical line, the x coordinate of the second
4   vertical line, the y coordinate of the first horizontal line, and the y coordinate of the second
5   horizontal line.

1   36.   The system of Claim 29 having further instructions which when executed by
2   the processor cause the system to perform further operations comprising:
3   determining which images of each of the sequences of images are key frames.

1   37.   The system of Claim 36 wherein determining causes the system to perform
2   operations comprising:
3   determining whether the current image is the first frame of one of the sequences of
4   images, and, if so, designating the current image as a key frame;
5   determining whether the active region of the current image is outside the active
6   region of a prior image, and, if so, designating the current image as a key frame; and
7   determining whether smoothing is needed, and, if so, designating the current image
8   as a key frame.

1   38.   The system of Claim 37 wherein determining whether smoothing is needed
2   causes the system to perform operations comprising:

3   calculating the difference in area between the active region of the current image and
4   the active region of the prior image; and
5   comparing the difference in area with a smoothing factor.

39.   The system of Claim 37 wherein the active region is a portion of any image
such that all pixels outside the active region of the image have no opacity.

1   40.   The system of Claim 39 having stored thereon further instructions which
2   when executed by the processor cause the system to perform further operations comprising:
3   adding a boundary to the active region of the current image.

1   41.   The system of Claim 29 wherein reading at least one sequence of images
2   comprises:
3   transferring at least one sequence of images from the storage device to the memory.

1   42.   The system of Claim 29 wherein reading at least one sequence of images
2   comprises:
3   transferring at least one sequence of images from a remote storage device via a
4   network.